

Redirecting element for seat belts with one-piece casing part

D e s c r i p t i o n

The invention relates to a redirecting element for a seat belt in motor vehicles, consisting of a one-piece metal body with a fixing eye and a belt guide slit supplied with a rounded running surface and a cladding part consisting of plastic held on the metal body as well as of a displacement body which limits the slot width for the belt strap to run through.

A redirecting element with the above characteristics is described in DE 202 05 570 U1. In order to take up the belt strap load and to cover metal bodies bolted to the car body, in particular in the case of metal bodies built into the pillar of the motor vehicle so as to be covered or semi-covered so that no metal areas are visible, a cladding part is held on the metal body, which, in the case of the embodiment described in DE 202 05 570 U1, consists of two side parts manufactured of plastic, which are each pushed onto the metal body from the side and are held together at the point where they strike against one another by connectors formed at this point. In addition, the displacement body which covers the area of the metal body which exhibits the fixing eye is firmly placed on the metal body.

The existing redirecting fitting is associated with the disadvantage that both individual parts which are needed to form the cladding part have to be manufactured and mounted separately, whereby the mounting

operation is complicated because the connector device between the individual parts has to be threaded in. This presupposes precise manufacture as regards fitting characteristics not only of the individual components of the cladding part, but also of the metal body, in order that the connecting device fits when the redirecting fitting is mounted.

The invention is therefore based on the task of simplifying the manufacture and mounting of a redirecting fitting with the characteristics described at the beginning of this document.

The solution of this task, including advantageous embodiments and further developments of the invention, results from the content of the patent claims which follow this description.

The basic concept on which the invention is based provides that the cladding part is formed as a one-piece body with edge areas which at least partially enclose the metal body and which can be firmly positioned on the metal body by means of pre-tensioning exercised on the metal body by the edge areas. The invention is therefore based on the concept of forming the cladding part as a unified and one-piece component to be attached to the metal body from one surface side of the metal body, whereby the cladding part is to be placed on the metal body in only one assembly step. The cladding part should be dimensioned in such a way that in assembled state its edge areas lie on the metal body in pretensioned fashion and that thereby the cladding part is held firmly on the metal body. For this purpose it is only necessary to bend open the cladding part, consisting of plastic and therefore yielding to some extent, so far during assembly that it can be fitted over the metal body. From this results the advantage that only one manufacturing step is needed for manufacture of the cladding part and also only one assembly step is needed.

The holder of the cladding part can be improved in that clip-type holders are formed on the metal body for holding the cladding part on the metal body; in this context it can be useful if at least a part of the edge areas enclosing the metal body is itself formed as a clip holder.

In so far as in one embodiment of the invention the metal body, in a way which is in fact already known from DE 202 05 570 U1, is formed with an outwards open C-shaped cross section at its lower bar which forms a running surface for the belt strap, it is provided for by one embodiment of the invention that the cladding part exhibits a groove for acceptance of the outer walls of the C-shaped cross section at its lower part which encloses the lower bar of the metal body.

According to one embodiment of the invention, it is provided for that the metal body exhibits, at its upper edge which limits the belt guidance slit towards the fixing eye, a course which is angled several times with a tab projecting centrally in the belt guidance slit with a limiting edge running at an angle of approximately 45 degrees to the longitudinal axis of the belt guidance slit and that the displacement body exhibits a contour of corresponding form for covering the part of the metal body which accommodates the fixing eye including the tab; this involves the advantage that, in contrast to the known form of the metal body, more material has been left between the limiting edges and the fixing eye, which improves the strength of the metal body; the displacement part is formed accordingly.

In a way which is in fact already known, it can be provided that the displacement body exhibits projections which extend into the fixing eye of the metal body and form an acceptance for a fixing means.

One embodiment of the invention provides that the displacement body exhibits lobes in its upper area which encloses the fixing eye, which extend beyond the contour of the metal body, as a limitation of the

rotational path of the redirecting element built into the motor vehicle around the fixing means.

With regard to simplification of mounting of the redirecting fitting, according to one embodiment of the invention it can be provided for that the cladding part exhibits a division formed by a slit in the area which surrounds the fixing eye; this division makes it easier to bend open the cladding part during fitting of the cladding part over the metal body; in this embodiment, the displacement body, which, as in the state of the art is formed separately, is clipped to the metal body, for which purpose corresponding clip holders can be provided.

In a further embodiment of the invention it is provided that the displacement body is formed in one piece with the cladding part; in this case the cladding part is in the form of a closed component and can preferably be fixed to the metal body by means of clip holders which are correspondingly provided. In this connection it can be provided for in an alternative manufacturing process, that the cladding part including the displacement body is formed around the metal body in an injection process, thus realising the one-piece form of displacement body and cladding part.

Embodiments of the invention are shown in the drawings, which are described below.

- Fig. 1 An individual view of the metal body of a redirecting fitting,
- Fig. 2 A first embodiment of a cladding element in a front view,
- Fig. 3 The object of Figure 2 in a rear view,

- Fig. 4 The cladding part according to Figure 2 or Figure 3 in a further overall view,
- Fig. 5 A displacement body in a front view,
- Fig. 6 The object of Figure 5 in an overall view,
- Fig. 7 The displacement body according to Figure 5 or Figure 6 in a state where mounted to the metal body according to Figure 1,
- Fig. 8 A further embodiment of the displacement body in the representation according to Figure 5,
- Fig. 9 The displacement body according to Figure 8 in an overall view,
- Fig. 10 The displacement body according to Figure 8 or Figure 9 in a state where mounted to the metal body according to Figure 1,
- Fig. 11 The displacement part in a different embodiment with displacement body formed in one piece,
- Fig. 12 The object of Figure 11 in an overall view,
- Fig. 13 The cladding part including displacement part according to Figure 11 or Figure 12 in a state where mounted to the metal body according to Figure 1.

In Figure 1, first the metal body 10 of a redirecting element for a seat belt in motor vehicles can be seen, which is in fundamental agreement with the generic state of the art according to DE 202 05 570 U1. In

detail, the metal body 10 which is preferably manufactured of steel plate by means of cold forming, exhibits an upper area 11 with a fixing eye 12 formed in it through which a fixing means, not shown, should pass for the fixing of metal body 10 to a vehicle component. Following this, at the upper area 11, metal body 10 expands into an area into which a belt guidance slit 13 is formed by means of transition into a C profile 15 with walls 16 at a corresponding distance from one another, whereby the lower bar 14 of metal body 10 formed by C profile 15 exhibits an in particular rounded running surface for the belt strap of the seat belt which is guided through belt guidance slit 13. The top limitation of the belt guidance slit 13 which is directed towards fixing eye 12 is formed by means of a course which is angled several times with a tab 14 which projects centrally in belt guidance slit 13 along with limiting edges 18 which run in an angle of approximately 45 degrees to the longitudinal axis of the belt guide slit 13, whereby a larger area of material is left between the limiting edges and the fixing eye, which improves the stability of metal body 10.

In Figures 2 to 4, first, in a first embodiment, a unified and one-piece cladding part 19 can be seen, which is harmonised as regards its contour with the dimensions of metal body 10 in such a way that it lies securely on metal body 10 solely by means of the pretensioning which is present. For this purpose, the cladding part 19, in addition to a central opening 20 which allows space for the belt guidance slit 13 of metal body 10 including the area of metal body 10 which creates Tab 17, exhibits in its top area quarter-circular segment-shaped limitations 21 for partial enclosure of fixing eye 12 of metal body 10, whereby limitations 21 are divided by a slit 22, so that a corresponding yielding quality of cladding part 19 is created. Over a part of its circumference, cladding part 19 exhibits edge areas 25 which enclose the outer contour of the metal body, and further, in the area of its area which covers or encloses the lower bar 14 of metal body 10 exhibits a groove 23 for accommodation

of a wall 16 of C-profile 15, so that in this area, cladding part 19 is held on metal body 10 by means of an interference fit. Further holding of cladding part 19 on metal body 10 is achieved by means of the pre-tensioning which is exercised by edge areas 25. As can be seen from Figure 3, cladding part 19 is not implemented in full cross-section on its side which cannot be seen when it is installed, but is implemented with bridges 24 formed by gaps in the material.

In accordance with the state of the art described in DE 202 05 570 U1, a displacement body 26 shown in different embodiments in Figures 5 to 7 belongs to the one-piece cladding part 19 shown in Figures 2 to 4 whose function is described in detail in the state of the art. The displacement body 26 provided to cover upper area 11 of metal body 10 has, when being assembled, an eye 27 which aligns with fixing eye 12 of metal body 10, in whose edge area, projections which reach into fixing eye 12 of metal body 10 are formed, by means of which it is prevented in mounted state that the fixing means for fixing of the redirecting fitting on the part fixed to the vehicle comes into contact with the edge area of the fixing eye in the metal body. Furthermore, displacement body 26 exhibits a limiting bridge 29 which reaches over tab 17 of metal body 10 and covers belt guide slit 13 of metal body 10 in part, by means of which the gap width of the belt slit formed in the redirecting element is in the last analysis defined. In order to position displacement body 26 firmly on metal body 10, a clip projection 30 is formed in the upper area of the top edge of displacement body 26; additionally, projections 28 are also provided with corresponding clip hooks 28a, so that the displacement body 26 can be firmly positioned on metal body 10.

The example of displacement body 26 which is shown in Figures 8 to 10 basically differs from the embodiment shown in Figures 5 to 7 in that in its upper area which encloses fixing eye 12 of metal body 10 displacement body 16 exhibits lobes 31 which project over the contour of

the metal body and which serve as a limitation of the rotation path of the redirecting element which is installed in the vehicle round its fixing means. Furthermore, additional clip holders 32 are provided in the area of limiting bridge 29 and enclose limiting edges 18 of metal body 10.

In the case of the embodiment finally shown in Figures 11 to 13, cladding part 19 and displacement body 26 are formed in one piece, so that a uniform component results which can be manufactured in one process, whereby only one assembly step is needed for manufacture of the redirecting element.

The characteristics of the object of these documents which are described in the above description, the patent claims, the summary and the drawing can be of fundamental significance for the realisation of the invention in its various embodiments both individually and in any desired combinations with each other.